Using GIS to Breathe New Life Into Historic Soil Surveys

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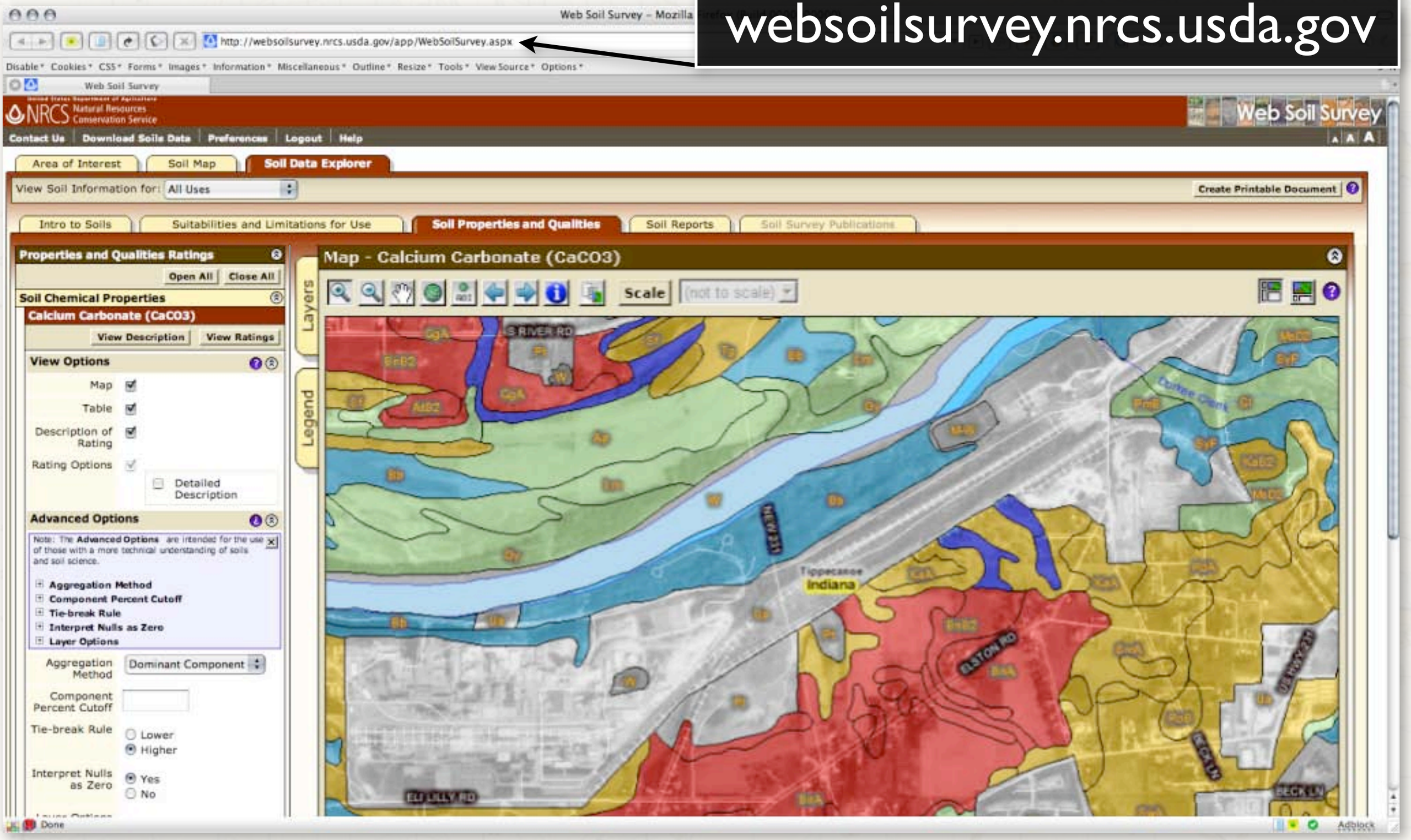
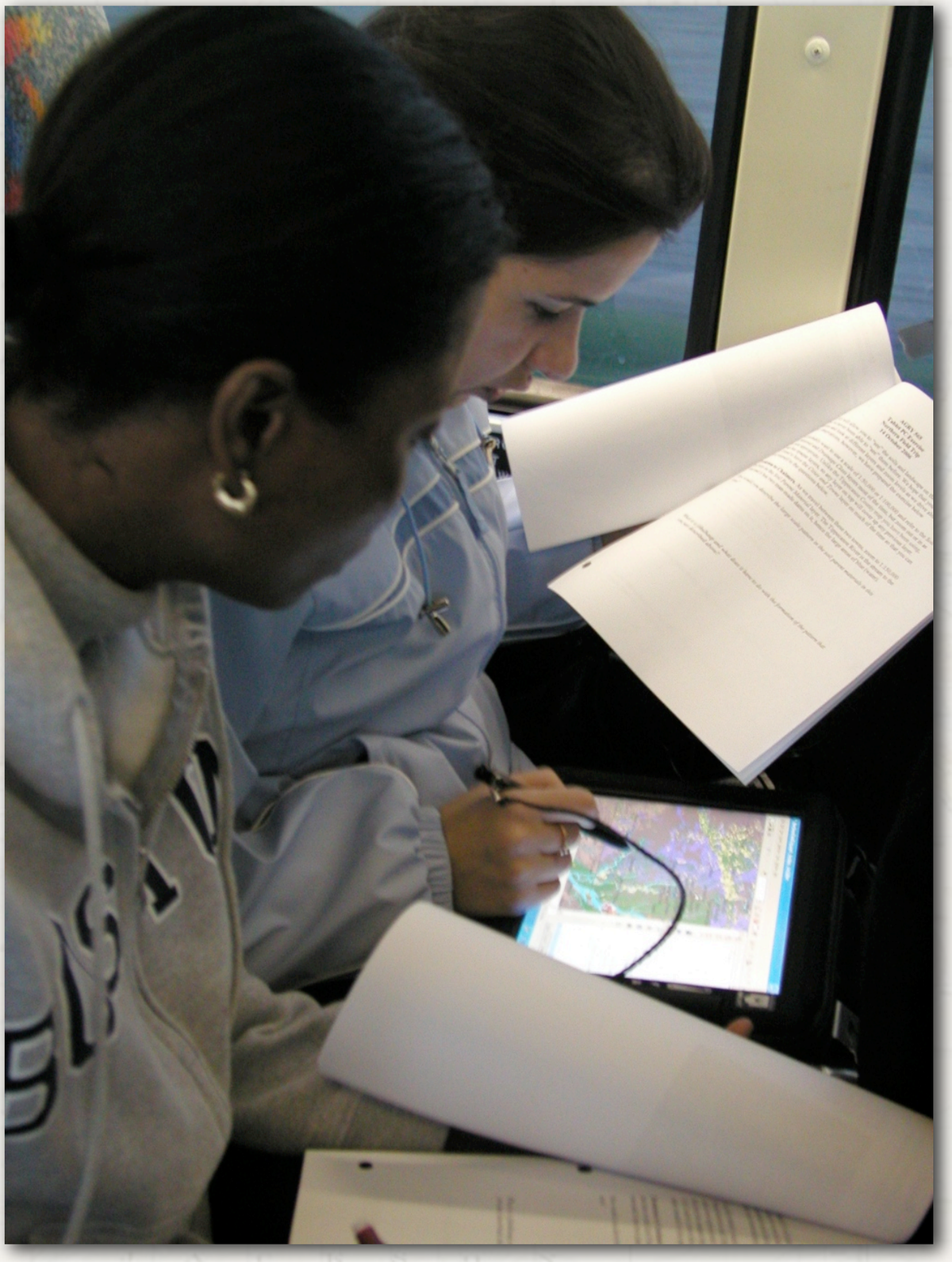


The Project:

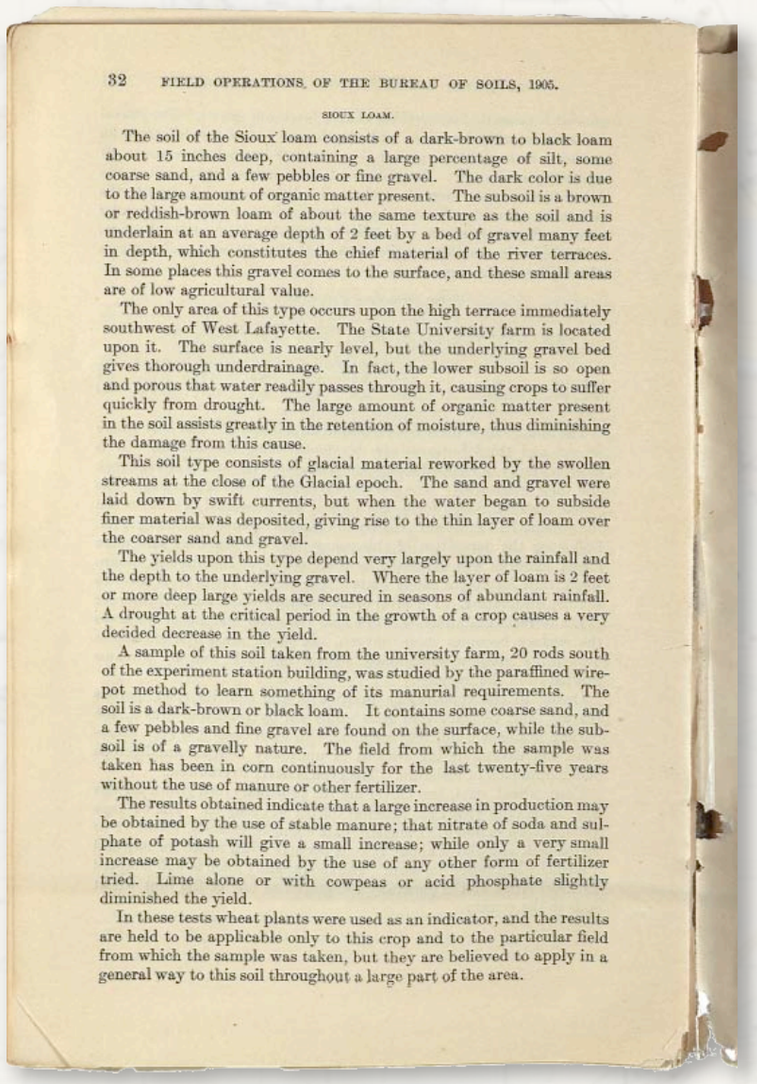
- Older soil surveys are not be systematically digitally preserved
- The Agronomy Department was celebrating its Centennial
- Prof. Darrell Schulze project
  - Rugged tablet PCs in the field
  - Tippecanoe soil datasets



- Purdue University Libraries is resurrecting a 1906 Soil Survey and mashing it with itself in order to add value, access, and interaction beyond the more traditional scan/describe/store model of collection recovery.

- Including: text, map (GIS layer), plus related documents for context

A Story in Two Formats



32 FIELD OPERATIONS OF THE BUREAU OF SOILS, 1905.

SIOUX LOAM.

The soil of the Sioux loam consists of a dark-brown to black loam about 15 inches deep, containing a large percentage of silt, some coarse sand, and a few pebbles or fine gravel. The dark color is due to the large amount of organic matter present. The subsoil is a brown or reddish-brown loam of about the same texture as the soil and is underlain at an average depth of 2 feet by a bed of gravel many feet in depth, which constitutes the chief material of the river terraces. In some places this gravel comes to the surface, and these small areas are of low agricultural value.

The only area of this type occurs upon the high terrace immediately southwest of West Lafayette. The State University farm is located upon it. The surface is nearly level, but the underlying gravel bed gives thorough underdrainage. In fact, the lower subsoil is so open and porous that water readily passes through it, causing crops to suffer quickly from drought. The large amount of organic matter present in the soil assists greatly in the retention of moisture, thus diminishing the damage from this cause.

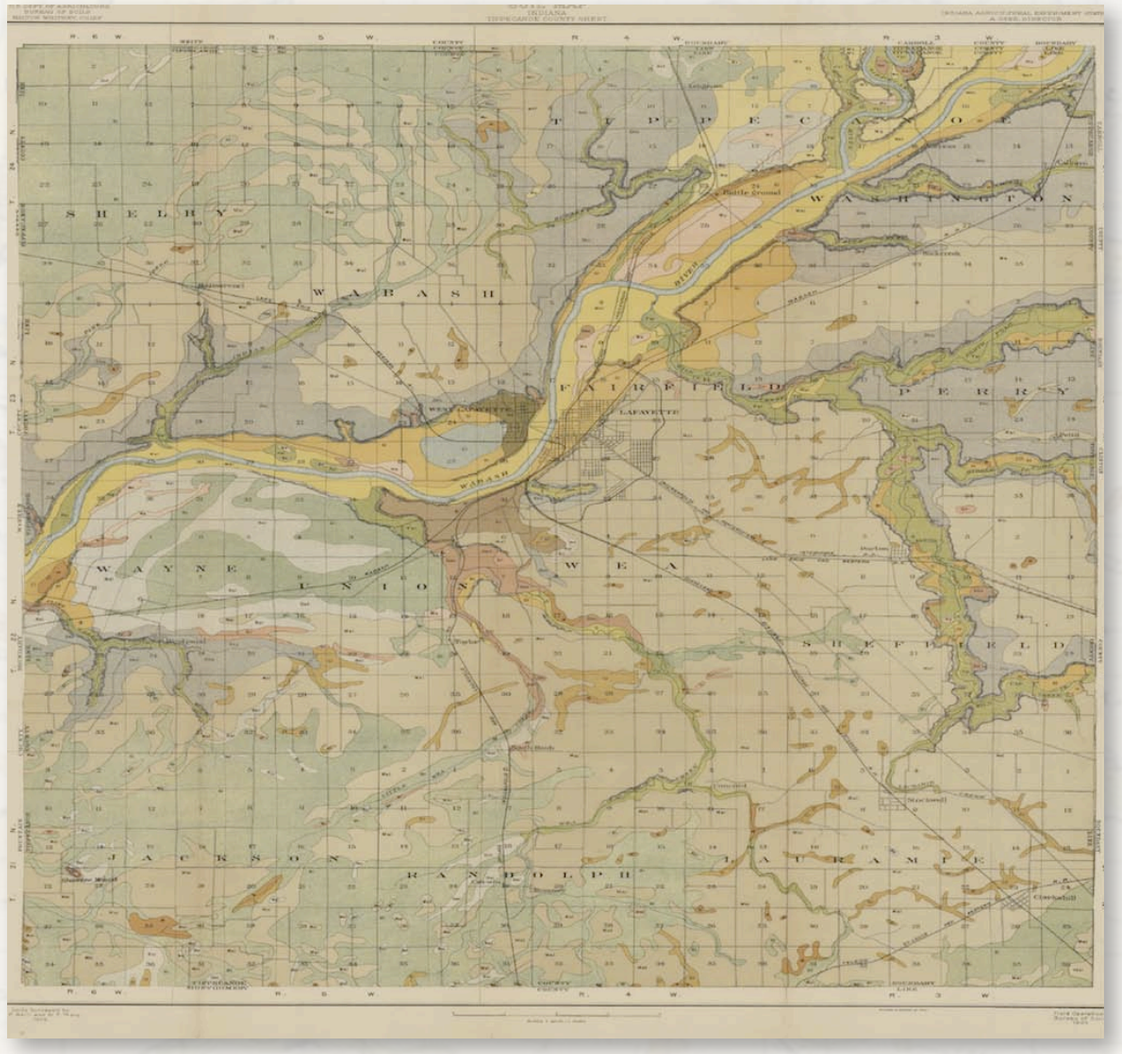
This soil type consists of glacial material reworked by the swollen streams at the close of the Glacial epoch. The sand and gravel were laid down by swift currents, but when the water began to subside finer material was deposited, giving rise to the thin layer of loam over the coarser sand and gravel.

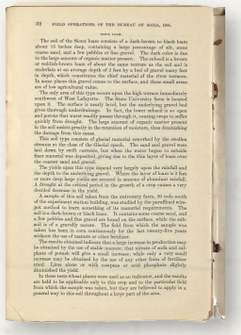
The yields upon this type depend very largely upon the rainfall and the depth to the underlying gravel. Where the layer of loam is 2 feet or more deep large yields are secured in seasons of abundant rainfall. A drought at the critical period in the growth of a crop causes a very decided decrease in the yield.

A sample of this soil taken from the university farm, 20 rods south of the experiment station building, was studied by the paraffined wire-pot method to learn something of its manurial requirements. The soil is a dark-brown or black loam. It contains some coarse sand, and a few pebbles and fine gravel are found on the surface, while the subsoil is of a gravelly nature. The field from which the sample was taken has been in corn continuously for the last twenty-five years without the use of manure or other fertilizer.

The results obtained indicate that a large increase in production may be obtained by the use of stable manure; that nitrate of soda and sulphate of potash will give a small increase; while only a very small increase may be obtained by the use of any other form of fertilizer tried. Lime alone or with cowpeas or acid phosphate slightly diminished the yield.

In these tests wheat plants were used as an indicator, and the results are held to be applicable only to this crop and to the particular field from which the sample was taken, but they are believed to apply in a general way to this soil throughout a large part of the area.





A Story in Two Formats

what the Miami black clay loam, but the color of the soil is generally much lighter.

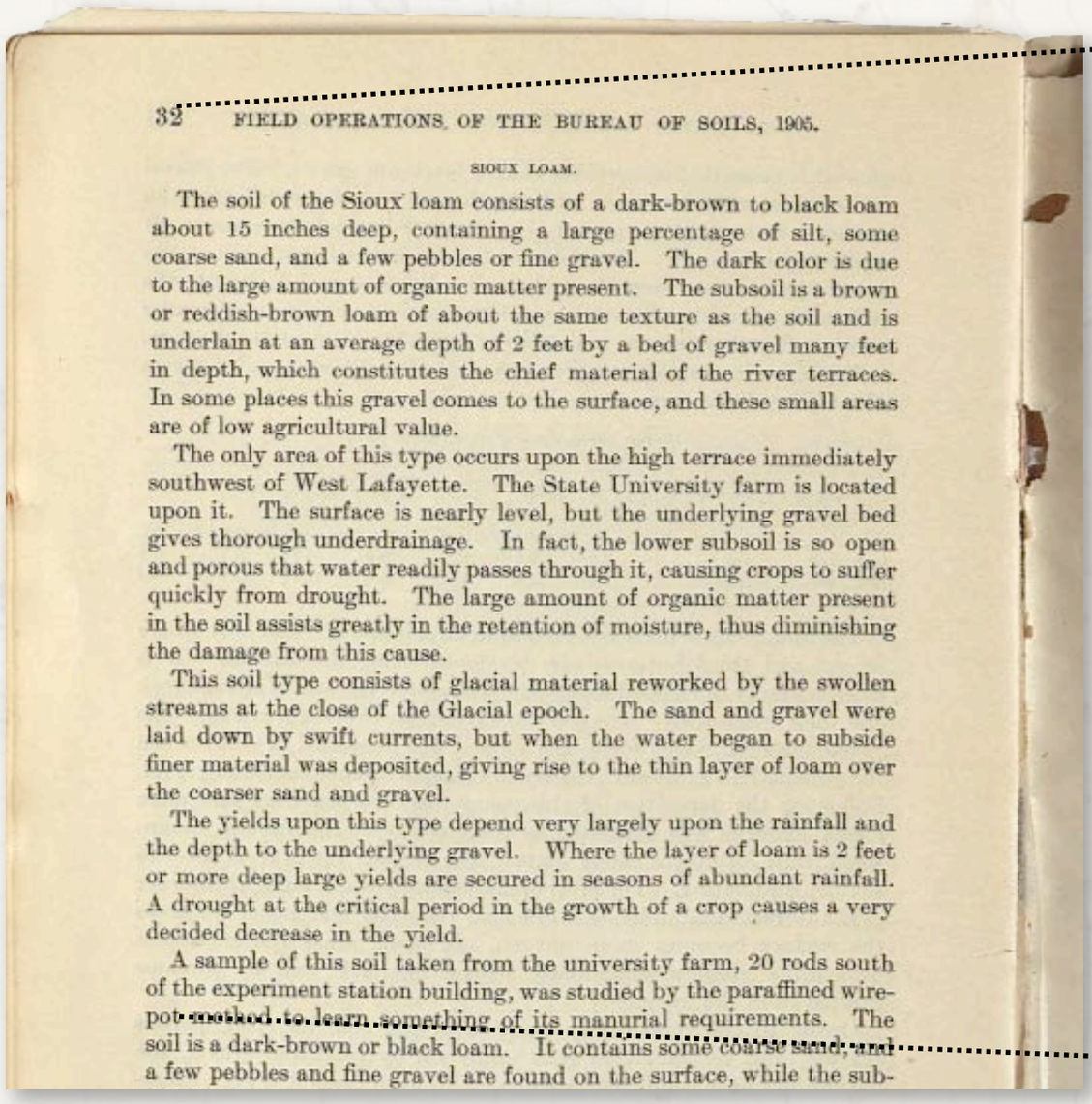
As the depth of the soil increases the percentage of clay also increases, and below 18 or 20 inches it grades into a heavy silt loam subsoil, which gradually becomes heavier, grading in turn into a silty clay, which extends to a depth of over 3 feet. Over the greater part of the type the color of the subsoil is much like that of the soil, but in some localities it is slightly mottled. There is no distinct line of separation between the soil and subsoil, and the change from one to the other is marked only by the gradually increasing clay content.

The following table gives the results of mechanical analyses of a of a typical sample of this soil type:

Mechanical analyses of Wabash silt loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
13626	Soil	0.0	Trace.	0.3	27	2.1	66.1	28.4
13627	Subsoil	.0	0.0	.2	27	3.2	62.2	31.9

< Miami Loam >



32 FIELD OPERATIONS OF THE BUREAU OF SOILS, 1905.

SIOUX LOAM.

The soil of the Sioux loam consists of a dark-brown to black loam about 15 inches deep, containing a large percentage of silt, some coarse sand, and a few pebbles or fine gravel. The dark color is due to the large amount of organic matter present. The subsoil is a brown or reddish-brown loam of about the same texture as the soil and is underlain at an average depth of 2 feet by a bed of gravel many feet in depth, which constitutes the chief material of the river terraces. In some places this gravel comes to the surface, and these small areas are of low agricultural value.

The only area of this type occurs upon the high terrace immediately southwest of West Lafayette. The State University farm is located upon it. The surface is nearly level, but the underlying gravel bed gives thorough underdrainage. In fact, the lower subsoil is so open and porous that water readily passes through it, causing crops to suffer quickly from drought. The large amount of organic matter present in the soil assists greatly in the retention of moisture, thus diminishing the damage from this cause.

This soil type consists of glacial material reworked by the swollen streams at the close of the Glacial epoch. The sand and gravel were laid down by swift currents, but when the water began to subside finer material was deposited, giving rise to the thin layer of loam over the coarser sand and gravel.

The yields upon this type depend very largely upon the rainfall and the depth to the underlying gravel. Where the layer of loam is 2 feet or more deep large yields are secured in seasons of abundant rainfall. A drought at the critical period in the growth of a crop causes a very decided decrease in the yield.

A sample of this soil taken from the university farm, 20 rods south of the experiment station building, was studied by the paraffined wire-pot method to learn something of its manurial requirements. The soil is a dark-brown or black loam. It contains some coarse sand, and a few pebbles and fine gravel are found on the surface, while the sub-

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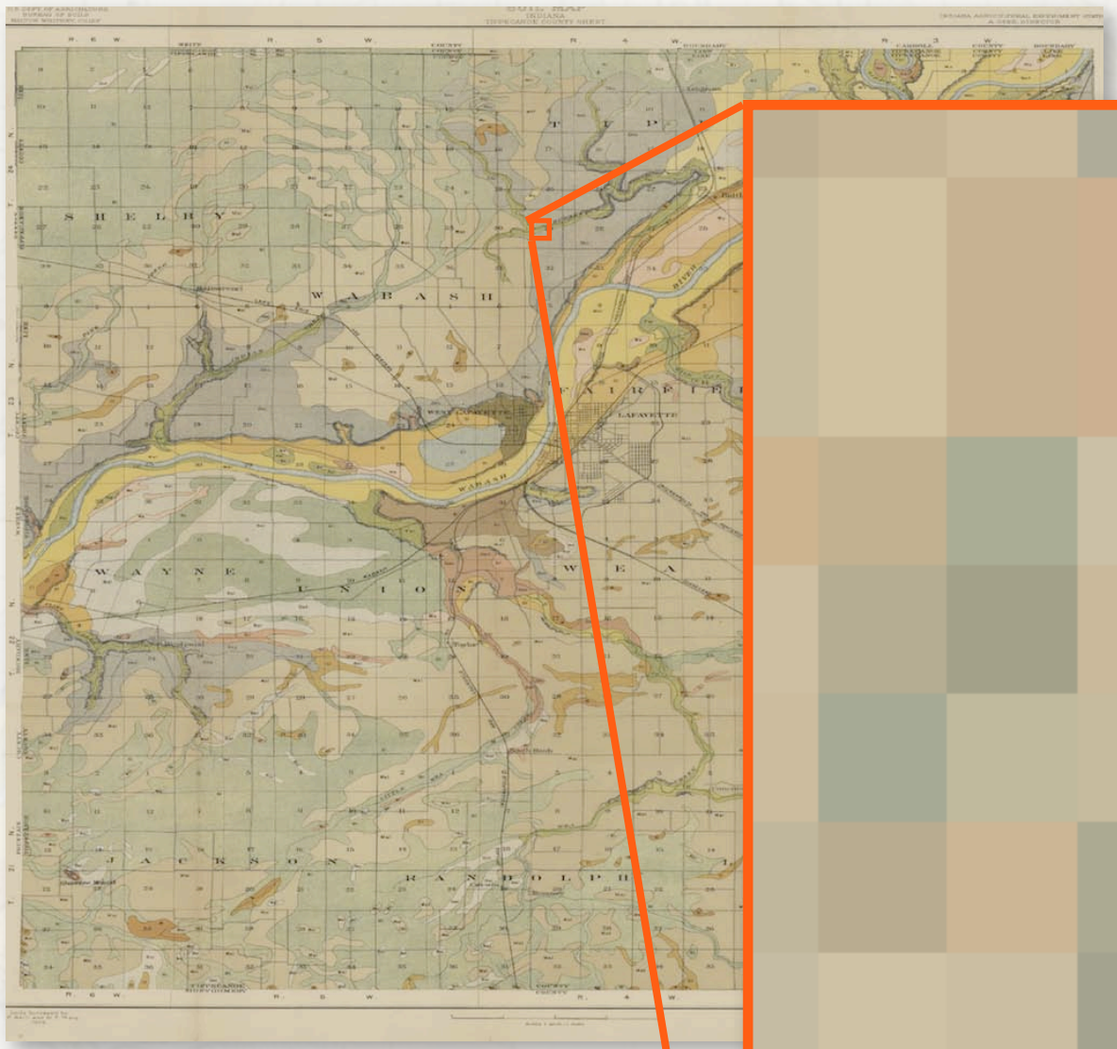
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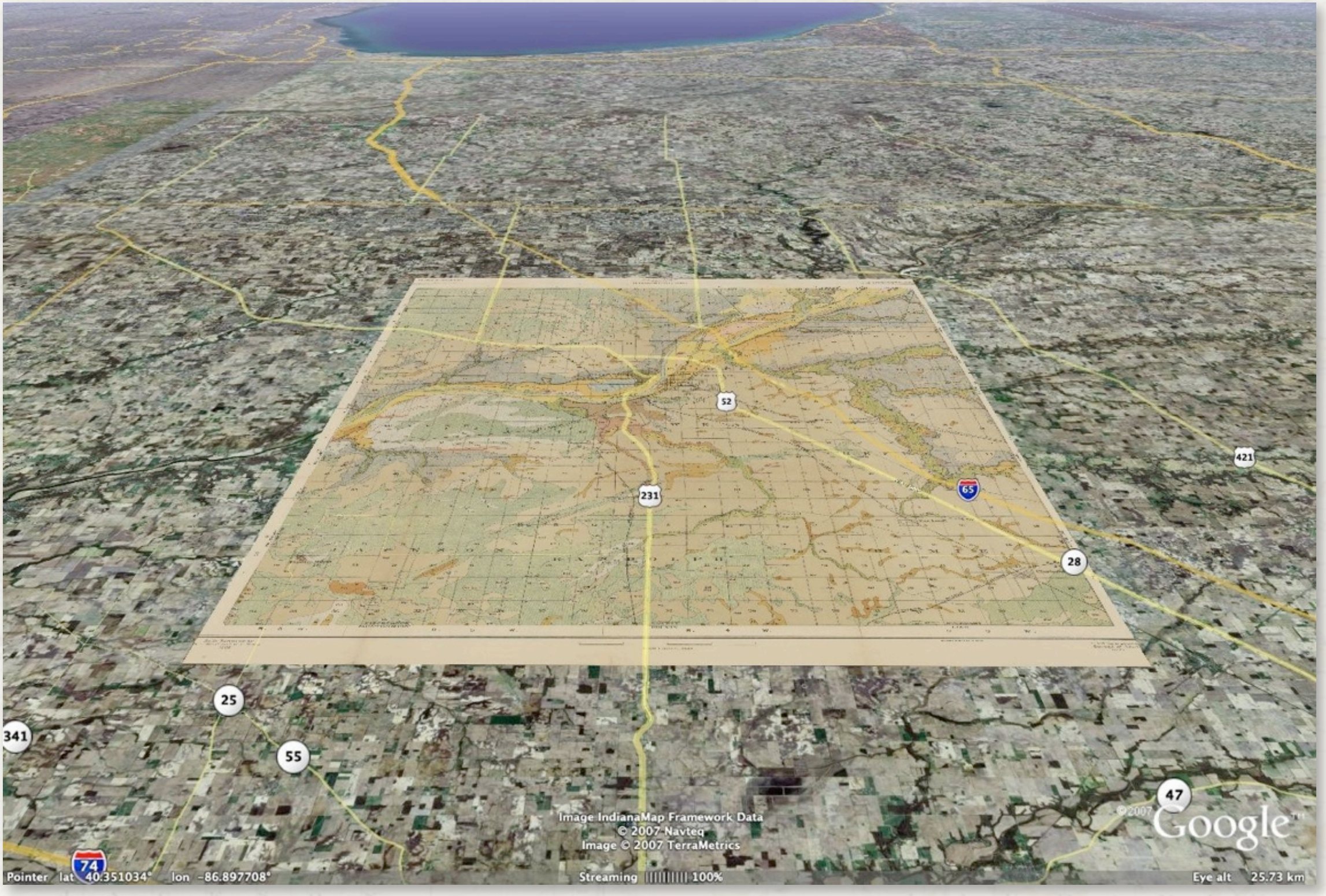
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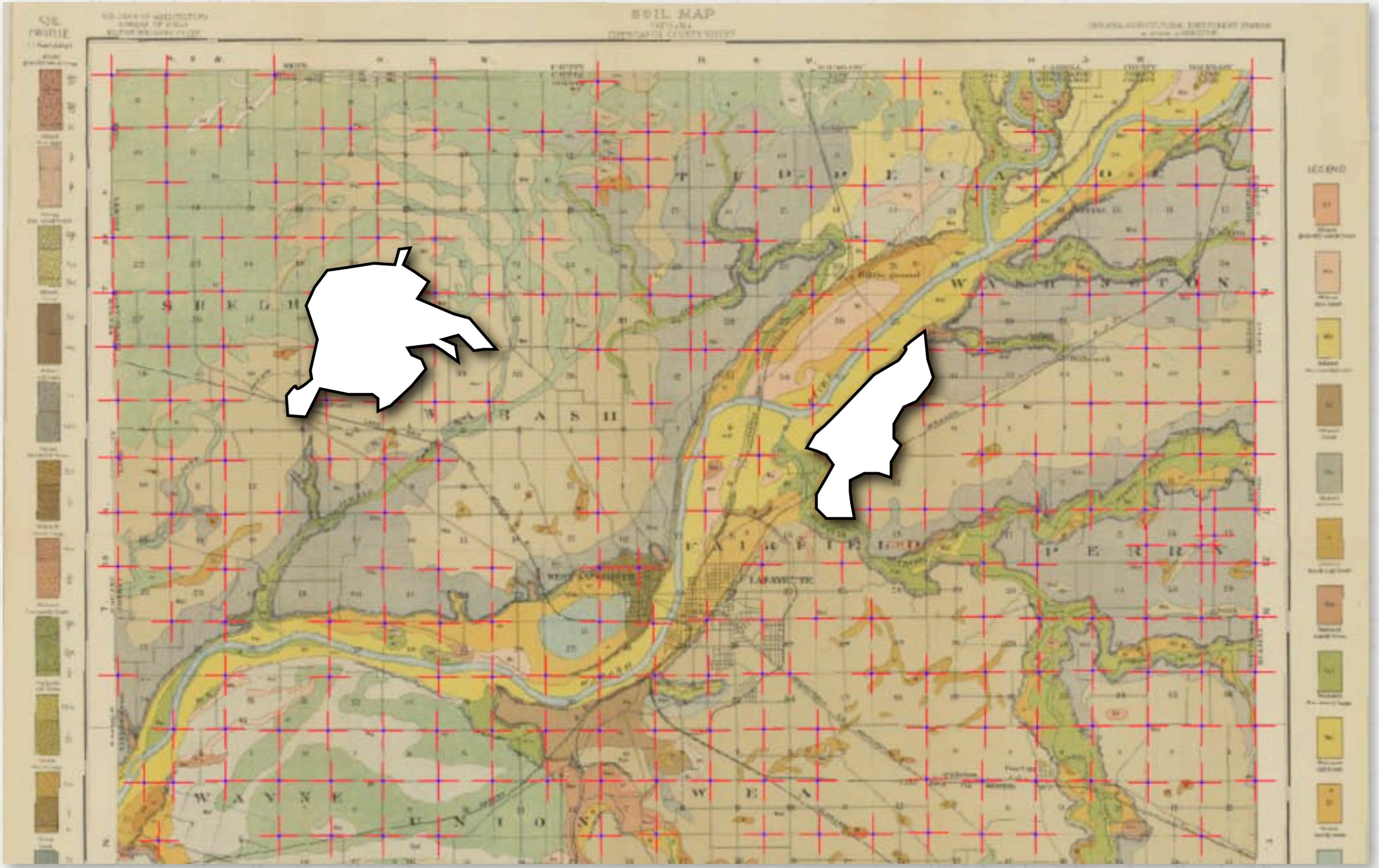

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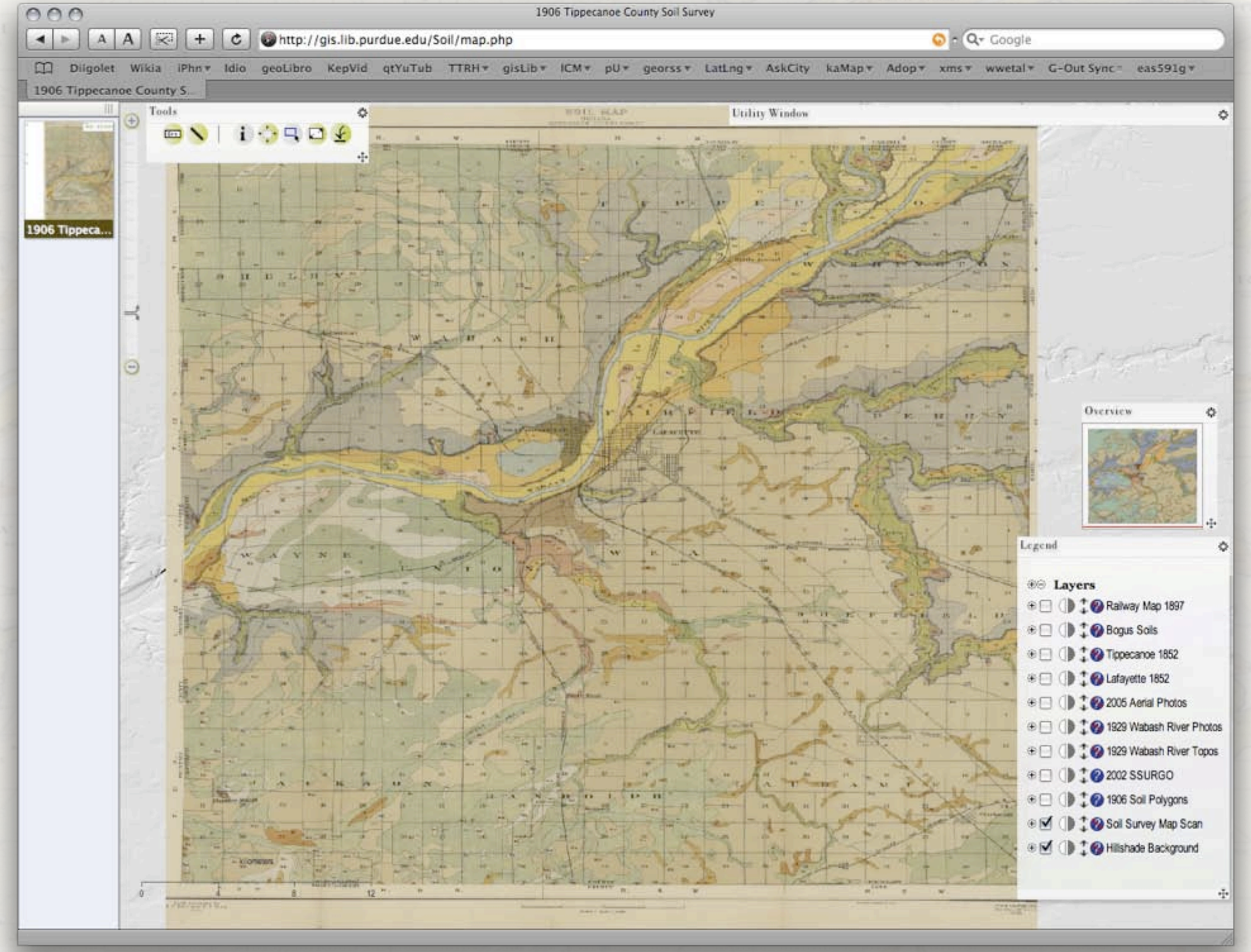
1906 Tippecanoe County Soil Survey
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Bogus Soils
Tippecanoe 1852
Lafayette 1852
2005 Aerial Photos
1929 Wabash River Photos
1929 Wabash River Topos
2002 SSURGO
1906 Soil Polygons
Soil Survey Map Scan
Hillshade Background


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Glen Mall
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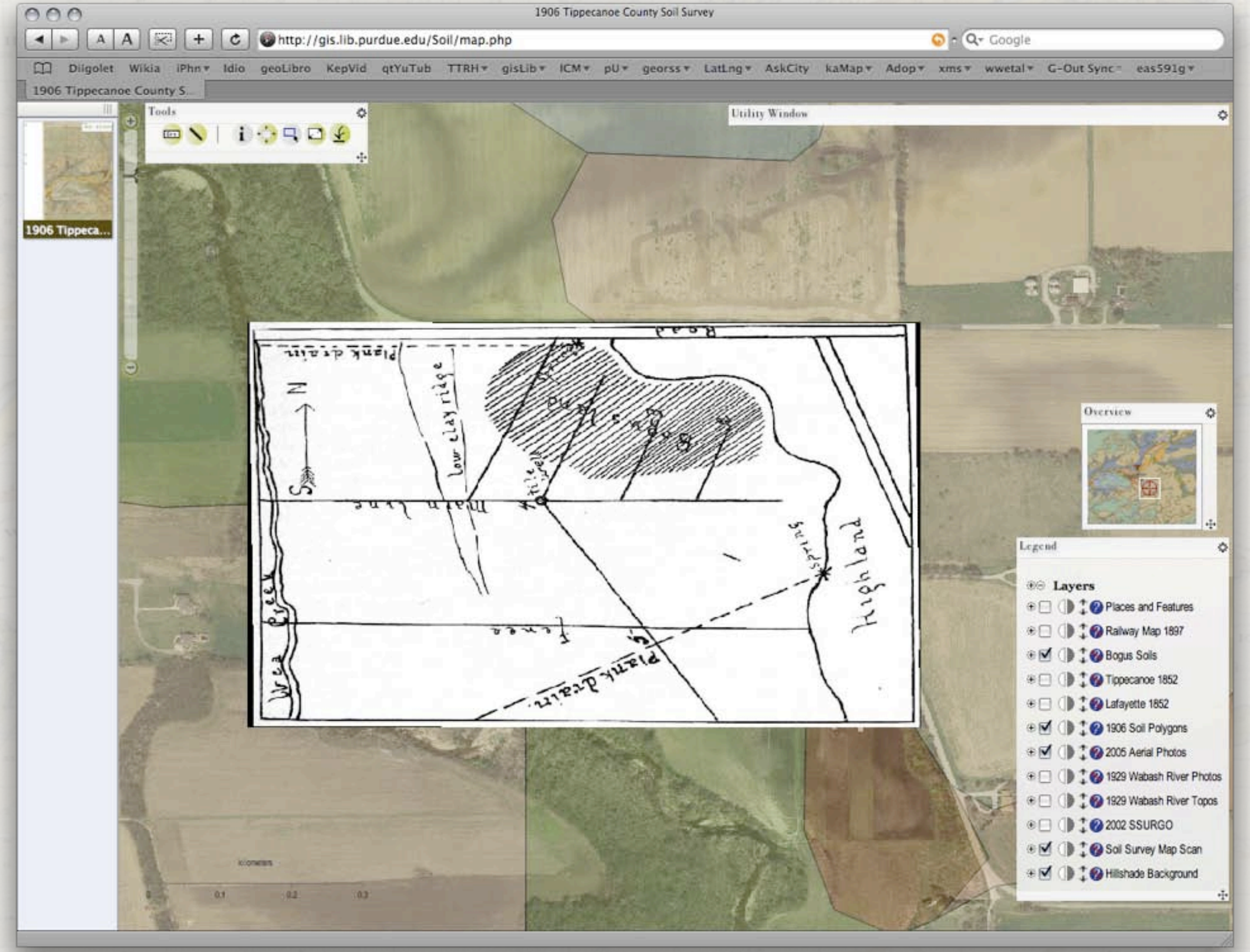
Stockwell
Odell
TIPPECANOE
Romney
Clarks Hill
Sugar Grove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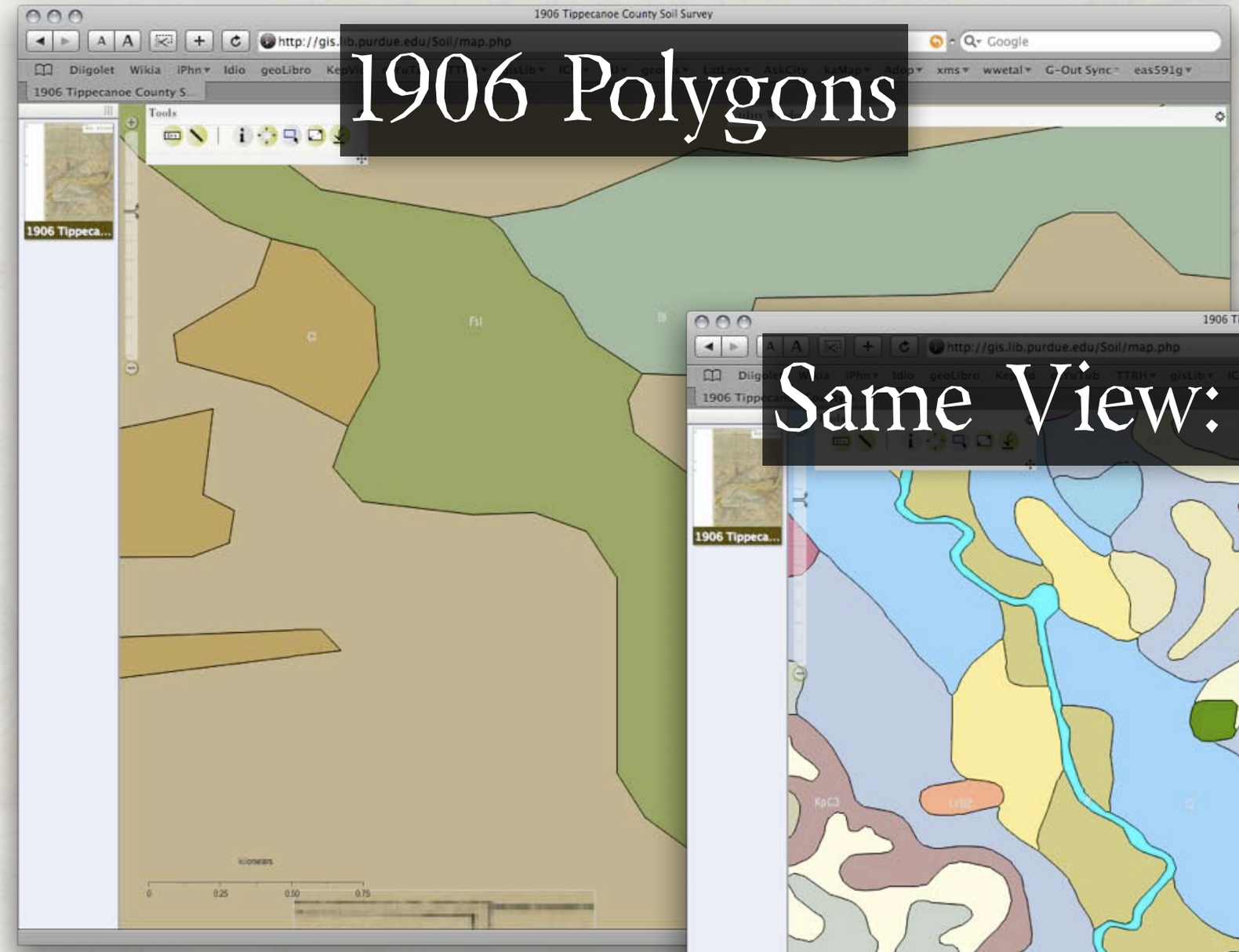
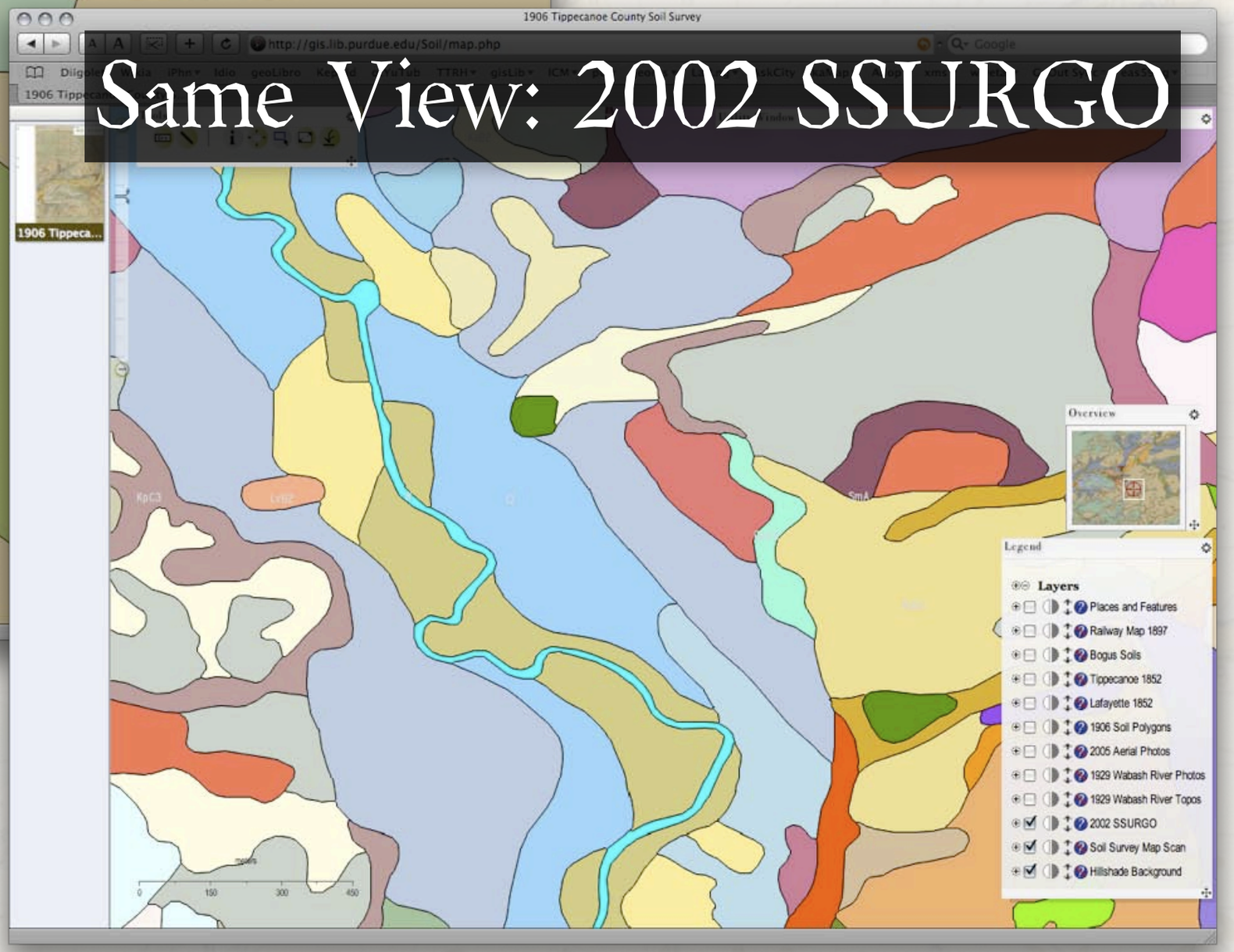
Soil Survey Map Scan
Hillshade Background
Plank drain
Low clay ridge
Wea Creek
Highland
Springs
Road

1906 Polygons



Same View: 2002 SSURGO



The Beta:

gis.lib.purdue.edu/Soil

The Future:

- more, but...
- deep (more of Tippecanoe, more years)?
- or wide (more of Indiana, U.S. starting with ~1906)?

Special thanks to Jae Kim & Chiung-Shiuan Fu
Grad. Assistants, Purdue University Libraries